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Tulsa Tornado Tribune

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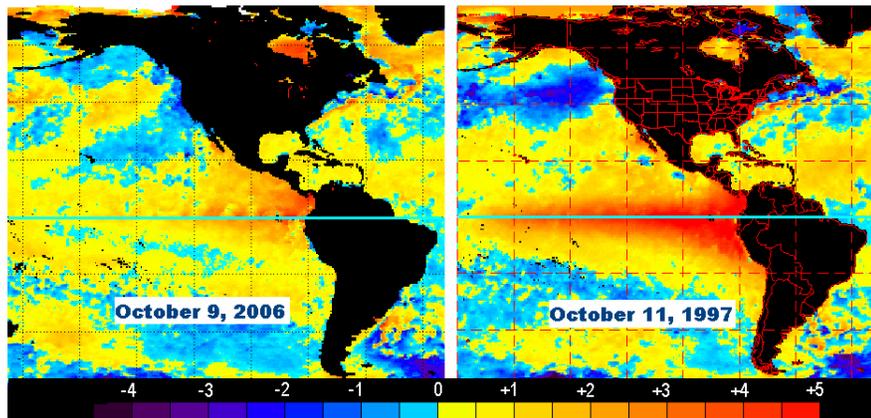


National Weather Service Tulsa, Oklahoma

Fall, 2006

EL NIÑO DEVELOPING

Scientists at the NOAA Climate Prediction Center report that El Niño conditions have developed in the tropical Pacific and are likely to continue into early 2007. How will this impact the current drought?



A comparison of sea-surface temperature anomalies between the current developing El Niño (right), and the last "strong" El Niño in 1997-98 (left)

Recent observations show that ocean temperatures have increased considerably in the equatorial Pacific during the early fall. Current temperature anomalies consistent with "weak" El Niño conditions exist, but there appears to be potential for this event to strengthen into a moderate event by winter.

Some impacts from the developing El Niño are already evident in the pattern of tropical precipitation. Below average precipitation has been observed recently across all of Indonesia, Malaysia and most of the Philippines, which are usually the first areas to experience ENSO-related impacts. This dryness can be expected to continue, on average, for the remainder of 2006.

Also, the development of weak El Niño conditions likely has made this Atlantic hurricane season less active than was previously expected. El Niño typically acts to suppress hur-

(Please see [El Niño](#) on page 6)

20 YEARS AGO: RIVER FLOODS STRIKE NORTHEAST OKLAHOMA

River flood mitigation began long ago with the construction of numerous dams on area rivers. Occasionally, though, such measures can be put to a severe test in the form of prolonged heavy rainfall events. Such was the case 20 years ago this fall, when human efforts to corral nature's fury were pushed to the brink.

The stage for this weather event was actually set in the preceding weeks as much of the area received above normal rainfall during September. This was especially true during the latter half of the month, as a near stationary frontal boundary extended from the Texas Panhandle, through Oklahoma and southeastern Kansas, and into central Missouri. This boundary ultimately became the focus for enhanced

(Please see [Floods](#) on page 5)

Editor's Notes

For those who are tired of hearing about the ongoing drought, we offer good news. Early fall rains have eased conditions some over southeast Oklahoma, and El Niño offers a better chance of a wet season coming up.

And for a change of pace, we look back at a major flood event 20 years ago...to some it probably feels that long since a good rain!

Craig A. Sullivan - Editor

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Summer and Early Fall Severe Weather Review

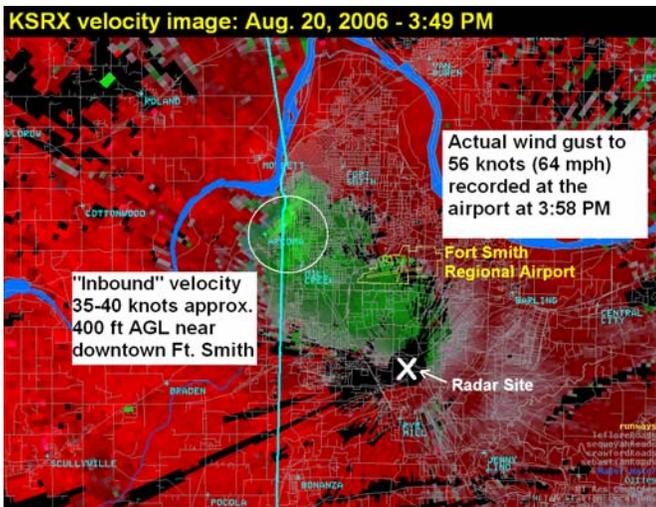
Despite the continuing dry pattern through most of the summer, there were a number of notable severe weather events that impacted eastern Oklahoma and western Arkansas. As is normally the case during the summer, the majority of severe weather came in the form of damaging downburst winds.

August 14-15

Isolated storms both afternoons resulted in localized downburst wind damage. The afternoon of the 14th saw several reports of structural damage, including a metal garage door blown out of a home in Huntsville in Madison County, and a barn destroyed in rural McIntosh County, OK. Roof damage was reported near Greenwood in Sebastian County, and in Poteau in LeFlore County. The next afternoon, the roof was blown off an elementary school in Sallisaw in Sequoyah County.

August 20

Afternoon thunderstorms produced significant wind damage in and around Fort Smith. Considerable damage was reported in downtown Fort Smith around 4 pm, along



with one injury resulting from flying glass in front of a downtown store. Most of the damage was concentrated in an area from 7th and Garrison to 20th and Rogers, where a microwave tower was blown over, numerous windows were blown out of buildings, air conditioning units were blown off of roofs and trees fell on several homes. An estimated 6000 homes were left without power by the storm. Minor damage was also reported in Alma and Mulberry in Crawford County.

August 21

Severe storms moved through the area during the early afternoon. A possible small tornado was reported 1 mile southwest of Rose in Mayes County. Winds of up to 70 mph caused significant damage in Cherokee County, including several homes damaged by fallen trees and one injury resulting from a fallen tree in Tahlequah. Roof damage was also reported at the sanitation plant in Tahlequah. Homes were also damaged in the community of Park Hill. Some minor structural damage was also reported in the towns of Farmington, Savoy and Lincoln in Washington County, AR.

August 26

An unusually strong cold front for late summer spawned severe thunderstorms during the late afternoon and evening. Several locations across northeast Oklahoma saw wind damage, mainly in the form of trees down. Damage to a metal outbuilding was reported in Okfuskee County, while some roof damage was reported in Vera in Washington County, OK. The storms also dumped over four inches of rain just east of Broken Arrow, OK, which caused some minor flooding. More importantly, this front essentially brought an end to the long, hot summer of 2006 as temperatures cooled to below normal levels for the next two weeks.

September 21-23

The autumn's most significant episode of severe weather thus far occurred as an unseasonably strong upper level low pressure system tracked across the plains. The scenario was very reminiscent of springtime outbreaks in the past, but one thing that lacked was low level moisture. Still, severe thunderstorms developed over southeast Oklahoma on the evening of the 21st, and produced the season's first confirmed tornado. Initial reports of damage to homes and a destroyed barn northwest of Antlers in Pushmataha County came in around 8:30 pm. A storm survey conducted by NWS Tulsa the next day confirmed that the damage was indeed the result of a tornado. The survey found a damage path just under a half-mile long and about 50 yards wide, and rated the twister an F0 based on minor damage to roofs and trees.

The next day, the most widespread severe weather of the fall thus far occurred as several rounds of thunderstorms pounded the area beginning that afternoon, and continued

(Please see [Severe](#) on page 6)

New StormReady Communities

Three more counties and communities have been certified as StormReady by the National Weather Service in Tulsa. Sebastian County was recognized as Arkansas' newest StormReady county at a news conference on September 9. Sebastian County joins six other counties and three cities in Arkansas with that designation.

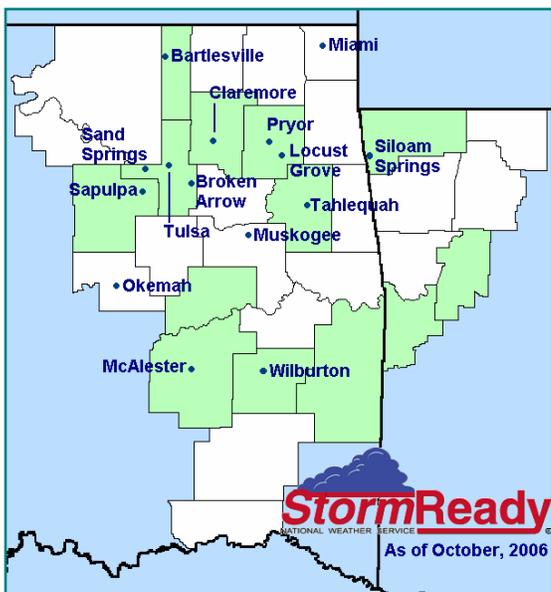
Cherokee County was recognized as Oklahoma's newest StormReady county on September 11. The recognition ceremony took place at a news conference in Tahlequah. Attendees included Tahlequah Mayor Ken Purdy, County Commissioner Doug Hubbard, Steve Palladino of the Oklahoma Department of Emergency Management, Muskogee Emergency Management Director Jimmy Moore, Ron Flanagan of RD Flanagan and Associates, and a number of volunteers who assist Emergency Management Directors Gary Dotson and Mike Underwood.



left to right: Wayne Johnson: Sebastian Co. Department of Emergency Management (SCDEM); Dave Whiteis: SCDEM Communications and Warning Officer; Steve Piltz: WFO Tulsa MIC; Jerry Roberts: SCDEM Director; Tonya Roberts: SCDEM Deputy Coordinator; Ed Calienes: WFO Tulsa WCM; David Hudson: Sebastian County Judge.

(photo by Tim Gehring: Northwest Area Coordinator - Arkansas Department of Emergency Management)

Finally, the City of Muskogee also became StormReady on September 11. The recognition ceremony took place at the City Council meeting



in Muskogee and was attended by several representatives from neighboring Cherokee County Emergency Management, Steve Palladino the Northeast Regional Coordinator for the Oklahoma Department of Emergency Management, Ron Flanagan of RD Flanagan and Associates, and a number of volunteers who assist Emergency Management Director Jimmy Moore. 🌩️

Flood Stage Change

The National Weather Service in Tulsa has proposed a change in the flood stage on Bird Creek near Owasso. The proposal is for the current flood stage of 19 feet to be lowered to 18 feet. Approval from the U.S. Army Corps of Engineers, the U.S. Geological Survey, and local government officials from Tulsa County and the cities of Tulsa and Owasso, has been given for this change. The change is scheduled to become effective Tuesday, October 31, 2006.

Flood stage is the elevation above gage zero at which overflow of the natural banks of a stream begins to cause damage or present a flood-damage hazard. It is determined by the National Weather Service office in coordination with local government officials. When the river forecasts for Bird Creek near Owasso were moved to the USGS gage on Mingo Road in January 1999, an initial flood stage of 19 feet was set. This was based on a comparative crest-to-crest study with the old gage at the highway 169 bridge.

For more information go to the AHPS link on the NWS Tulsa web page.

However, flood events since 1999 have led the Tulsa NWS office to re-evaluate that initial flood stage. In particular on March 5-6, 2004, the Owasso emergency management agency noted waters affecting 56th Street North near Mingo Road at a stage near 18 feet. The Tulsa NWS office had been waiting for another flood event to confirm the findings of March 2004 event, but no flooding has occurred since that time. Instead of delaying further, there is enough confidence based on the 2004 event to proceed with the flood stage adjustment.

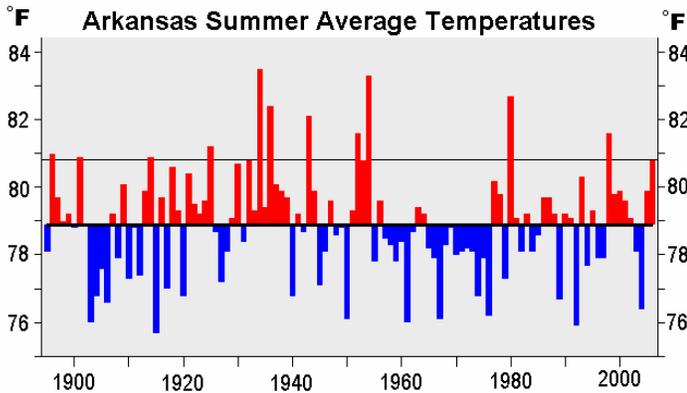
Comments and questions about this proposed flood stage change on Bird Creek near Owasso should be directed to the service hydrologist At the National Weather Service office in Tulsa. 🌩️

Al Hong – Service Hydrologist

How Hot Was It?

Here's a news flash for you - this summer was hot! But, was it really one of the hottest ever? Following is a statistical comparison with past years to see just how the summer of 2006 stacked up.

Starting with the big picture, the contiguous United States did indeed record its second hottest summer of the last 112 years (1895-2006) - second only to the summer of 1936. Basically all of the western two-thirds of the U.S. saw significantly above average temperatures this summer.

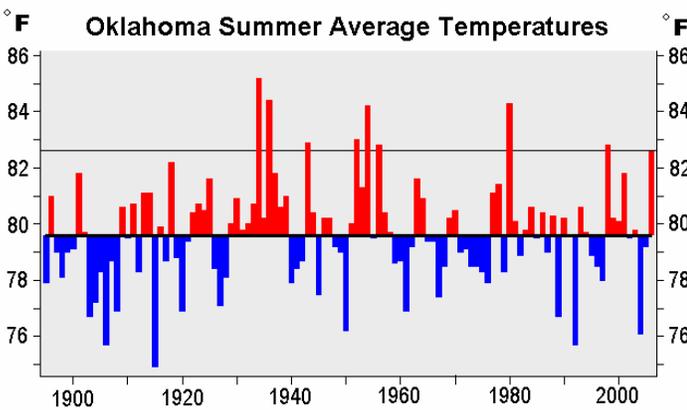


Statewide temperature data for Oklahoma and Arkansas were not as dramatic, but still showed a significant departure from average. Summer 2006 ranked as the 9th hottest for Oklahoma, and the 12th hottest for Arkansas. Both states recorded the hottest summer since 1998.

Breaking it down to the local level, here are some statistics for Tulsa, Fort Smith and McAlester:

2006 Summer temperatures

	2006	Normal	Rank	Record	Hottest Since
Tulsa	83.0	80.8	15	88.0 (1980)	2001
Ft. Smith	82.3	80.5	17	86.9 (1934)	2001



Days at or above 100 degrees

	2006	Average	Rank	Record	Most Since
Tulsa	23	14	22	65 (1936)	1983
Ft. Smith	23	10	16	54 (1954)	2000
McAlester *	35	12	4	63 (1954)	1980

* 1953-2006

The data shows that while it was a hot summer, it did not quite reach the level of some of the more infamous summers in the past. ☔

Local News

Awards Received

WFO Tulsa has been awarded a **2006 Southern Region Directors Award** for Teamwork. The award recognizes all the efforts that have happened at WFO Tulsa in the past year. Some of these include, but are not necessarily limited to; ground-breaking gridded forecast and decision support work, outstanding electronics and IT work, tactical responses to the 2005-06 fires, outstanding service during the March 12, 2006 F3 tornadoes with no fatalities, and the 1000th StormReady Community.

WFO Tulsa Meteorologist Bruce Sherbon

was awarded a **2006 NOAA Administrator's Award** for significant contributions to the development of the Radiosonde Replacement Systems (RRS) Operators Training Video. Congratulations Bruce (a true man of character)!

Outreach Activities

WFO Tulsa MIC Steve Piltz, Forecaster Brad McGavock, and Meteorologist Intern Nicole Kempf recently partnered with members of Sebastian County Emergency Management to staff an NWS informational display and safety booth at the 9th Annual Public Safety Fair in Fort Smith, Arkansas. This annual event was sponsored by KTCS radio station and the local ABC television affiliate. WFO Tulsa was one of a dozen organizations to participate

in this day-long event. One hundred people from west central Arkansas and east central Oklahoma stopped by the booth to ask questions and to pick up safety materials.

Members of the WFO Tulsa staff also took part in a "Meet and Greet" at the Promenade Mall in Tulsa on September 9 as part of "Family Preparedness Day".

New Transmitter

The Antlers, OK NOAA Weather Radio was placed on the air on September 26. Following a 30 day "burn-in" period, the coverage map will be plotted, and tone alerts will be activated. The Antlers Radio will broadcast on a frequency of 162.400 MHz, and the call sign will be KJY77. ☔

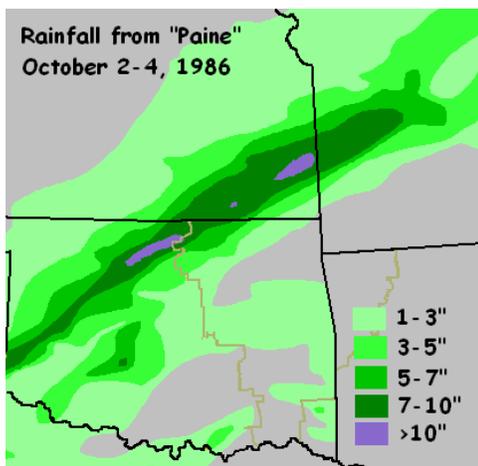


Floods

(Continued from page 1)

rainfall amounts across the area late in the month.

To make matters worse, the remnants of Hurricane Paine in the Pacific moved northeastward along the front during the first few days of October, bringing tropical moisture to the area. The tropical system and stationary



front combined to produce large amounts of additional rainfall across mainly north central Oklahoma and southeast Kansas, and runoff from this precipitation was accentuated by the saturated soil conditions. Some areas of north central Oklahoma and southeastern Kansas received more than 20 inches of rain during the 8-day period, or more than half of the annual average!

Needless to say, the rains produced extreme amounts of runoff into area streams and rivers. By October 4, severe floods were occurring in the Caney, Neosho and Arkansas River Basins in northeast Oklahoma. Many streams had maximum discharges with recurrence intervals of 50 to greater than 100 years, and several reservoirs were nearly filled to capacity. By this time, severe flooding had begun to occur in the city of Miami, OK as the Neosho River topped its banks, forcing the evacuation of about 500 families.

Two to four feet of water inundated some homes and businesses.

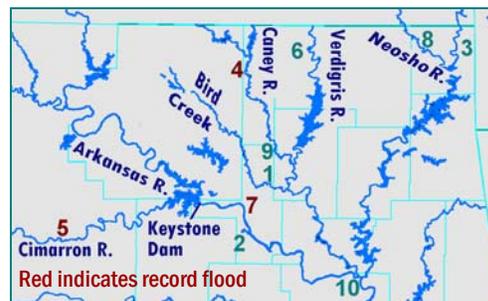
Conditions were even worse farther to the west, as the Caney River continued to rise and filled Hulah and Copan Reservoirs near Bartlesville, OK to capacity. This forced the U.S. Army Corps of Engineers to make emergency releases into the river, causing significant rises downstream at Bartlesville. By noon on the 4th, the river level was already up to 23 feet (18 feet or higher is considered a major flood), and the evacuation of over 10,000 residents had begun. Some people who waited to long to leave had to be rescued by the National Guard or by volunteers in boats. By that evening, about 800 homes were under water, some up to their roofs, and water covered almost one-third of the city. Ultimately, the Caney River would reach a record crest of 27.7 feet.

A similar scenario occurred at Keystone Lake, located on the Arkansas River west of Tulsa. Measurements taken by the Corps of Engineers showed 400,000 cubic feet of water per second were flowing into the lake from the Arkansas and Cimarron Rivers, threatening to reach the top of the dam. This forced the Corps of Engineers to release 300,000 cubic feet per second from the dam – 25 times the normal flow! The flood waters raced downstream toward the Tulsa area, and sandbaggers, levee watchers, and emergency teams worked around the clock. The entire suburban communities of Jenks and Bixby were ordered evacuated.

Along the river around Tulsa, widespread flood damage occurred. But in Tulsa, river flooding was more contained. A levee broke west (upstream) of downtown, but sandbaggers prevented significant damage. Levees and open-space preserves that were put in place after the devastating 1984 floods

largely did their jobs. Along the river front, Tulsa's River Parks were swamped, but dollar damages were limited to about \$113,000. The most serious problem occurred on the Arkansas west bank at Tulsa, in the neighborhood of Garden City, an aging cluster of low-income homes wedged between the river, refineries, and heavy industry, on land long contaminated by industrial pollution. River water entered Garden City from a low-point breach in a levee along the river's west bank. In all, about \$1.3 million in damages occurred to 14 homes, 11 industrial buildings, and 39 mobile homes. A few homes even flooded up to the rafters. The toxic, trapped water lingered up for days.

The final tally of damage was staggering, as 52 of Oklahoma's 77 counties received some type of flood damage. Estimated losses of 100 million dollars to roads and bridges, 75 million dollars to homes and businesses, and nearly 200 million dollars to agriculture made this one of Oklahoma's costliest flooding disasters.



Gauge Location	Max Stage	Major Flood	Date	Record Stage
1 Owasso	28.30	25.0	10/1	34.00
2 Jenks	21.80	21.0	10/2	25.00
3 Quapaw	33.11	30.0	10/2	46.15
4 Bartlesville	27.70	18.0	10/4	27.70
5 Perkins	26.75	22.0	10/4	26.75
6 Lenapah	38.34	35.0	10/5	40.44
7 Tulsa	25.21	22.0	10/5	25.21
8 Commerce	26.23	23.0	10/6	34.03
9 Collinsville	39.45	33.0	10/6	39.80
10 Muskogee	39.60	34.0	10/6	48.02

El Niño

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ricane activity by increasing the vertical wind shear over the Caribbean Sea region. However, at this time the El Niño impacts on Atlantic hurricanes are small.

Typical El Niño effects are likely to develop over North America during the upcoming winter season. Those include warmer-than-average temperatures over western and central Canada, and over the western and northern United States. Wetter-than-average conditions are likely over portions of the U.S. Gulf Coast and Florida, while drier-than-average conditions can be expected in the Ohio Valley and the Pacific Northwest.

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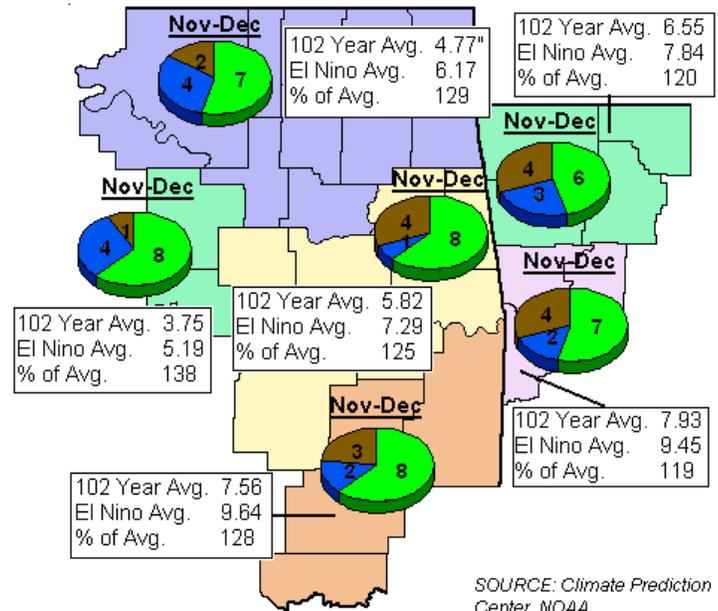
Want to know more about El Niño? Visit the Climate Prediction Center Web page and follow the El Niño/La Niña link on the left menu bar.

So how does this relate to the ongoing drought situation? As you can see from the graphic, all climate divisions show a trend toward wetter-than-normal conditions for the November through December period during *strong* El Niño events. However, the trend is less noticeable in *moderate* El Niño events, such as the current one, with the odds of above or below normal winter precipitation close to normal. As of early fall, the winter seasonal forecasts for this area remain rather inconclusive, but if the current El Niño strengthens more than anticipated, the odds of a wetter-than-normal winter could improve.

The latest Seasonal Drought Outlook issued by the Climate Prediction Center does call for some improvement in drought conditions across eastern Oklahoma and western Arkansas. But, this does not necessarily imply a wet winter season is ahead, or that the drought will be ending soon. In fact, current estimates are that between 150 and 200 percent of normal precipitation will be needed through December to bring an end to drought conditions. In any case, a wetter-than-average season would be a welcome change, and if nothing else, the odds of that happening are better than this time last year. ☔

El Niño Precipitation vs. Long Term Average November - December

Years: 1914, 1918, 1940, 1941, 1957, 1963, 1965, 1972, 1982, 1986, 1987, 1991, 1994



The graphic above depicts the observed precipitation for November and December during the 13 strongest El Niño events of the past century, compared to the 102 year average rainfall for climate division within Tulsa's CWA. The pie charts show the number of El Niño years out of the strongest 13 which fell into one of three categories. The green section represents the number of El Niño years that were among the wettest third of years on record (or wettest 34 years)... brown represents the number of years among the driest third (34 driest) on record...and blue represents those falling in the middle third (remaining 34 years). The table lists the 102 year average, the average of the precipitation totals observed during the 13 strongest El Niño events, and the departure from the climatological average precipitation.

Severe

(Continued from page 2)

through early the next morning of the 23rd. No tornadoes were reported with these storms, but there were numerous reports of large hail and wind damage, beginning with the initial storms across extreme northeast Oklahoma into northwest and west central Arkansas. Some minor structural damage occurred in the Huntsville area in Madison County. These initial storms went on to produce at least three dozen tornadoes in the Mississippi Valley that evening.

More storms developed during the evening, causing large hail across southeast Oklahoma and wind damage over portions of northeast Oklahoma and northwest Arkansas. The cold front moved into the area after midnight and produced a final round of storms in the early morning. The severe weather did not cease until after sunrise, as there were numerous reports of trees down in Washington and Franklin Counties in Arkansas. ☔